

Science

Physics

Fields

Classical Mechanics : For everyday things, which are much larger than atoms and much slower than the speed of light (the science developed by Galileo Galilei, Isaac Newton, etc.).

Relativistic Mechanics: a non-quantum mechanics of a system of particles or of a fluid in cases where some of the velocities are comparable to the speed of light.

(Matter) Quantum Mechanics

Quantum Field Theory

Chemistry

Biology

Gravity

Motion

Energy

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Force, Acceleration & Mass

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introduction

Definition

Force

Pushes + pulls that are not tangible, but whose effects can be observed.

Characteristics

Point of Application

The point where a Force is exerted upon a certain object.

Direction (of a Force)

The straight line Direction upon which the Force acts.

Magnitude (of a Force)

The strength of the Force.

Types

Contact

Forces exerted between bodies in Direct Contact with each other.

Examples

Normal Reaction

The natural push OR pull exerted on any object acting on a surface.

Friction Force

A Force that resists movement.

Air Resistance

Friction Force between (air + any object traveling through it).

Upthrust Force

The upward push applied by water on the object immersed in it.

Tension Force

The Force exerted by the rope on the object hanging from it.

Action @ a distance

Forces between 2 interacting bodies that are not in physical Contact with each other.

Measurements (Effect)

on Matter

Interaction without Energy transfer

Effect of a force on the shape of an Elastic object

Elastic

Direction of energy transfer

Effect of an Unbalanced force on a Rigid body

Rigid Body

Any object whose parts don't move with respect to each other while in motion.

Canceling the effect of

Weight

The downward action-at-a-Distance Force of gravity exerted by the Earth on an object.

Friction

A Force that resists movement.

Velocity

In an inertial state a body continues in its state of rest OR uniform motion unless it is compelled to change that state by an unbalanced Force.

Newton's 1st Law

Scientific Law

When a generalization has withstood 100s or 1000s of tests without any counter example being found & its predictions have always been fulfilled

Rest

is a special case of motion where the velocity is zero

Acceleration

Mass

A property of matter that influences the acceleration an object experiences when subjected to a Force.

of a Net Force

Theory

$F = m \times a$

Newton's 2nd Law

Type

Direct Proportionality

Definition

Recognizing

When the graph of a variable quantity A versus another variable quantity B is a straight line that passes through the origin, we say that A is Directly proportional to B.

Inverse Proportionality

When  $A \times B = k$ , where k is a Constant & A & B are variables, we say A is inversely proportional to B.

Other kinds of proportionality

The simple Pendulum

The Oscillating Spring-Mass system